

CLAIMS:

What is claimed is:

- 1 1. A method in a storage device for dynamically
2 determining and adjusting a number of data blocks to be
3 prestaged in a cache included in said storage device,
4 said method comprising the steps of:
 - 5 receiving and processing a plurality of input/output
6 (I/O) requests by said storage device;
 - 7 accumulating information about said plurality of I/O
8 requests and said processing of future I/O requests by
9 said storage device; and
 - 10 utilizing said accumulated information to
11 dynamically adjust a prestaging policy as said storage
12 device receives and processes said plurality of requests,
13 said prestaging policy defining a current number of data
14 blocks to be prestaged in said cache.
- 1 2. The method according to claim 1, wherein said
2 receiving and processing a plurality of input/output
3 (I/O) requests by said storage device further comprises
4 receiving and processing a plurality of contiguous,
5 sequential input/output (I/O) requests by said storage
6 device.
- 1 3. The method according to claim 1, wherein said
2 accumulating information further includes:
 - 3 determining an average number of contiguous
4 sequential blocks accessed for each one of said plurality
5 of I/O requests.

1 4. The method according to claim 1, wherein said
2 accumulating information further includes:

3 determining a percentage of previously prestaged
4 data blocks that were actually referenced.

1 5. The method according to claim 1, wherein said
2 accumulating information further includes:

3 determining a current utilization of said storage
4 drive.

1 6. The method according to claim 1, further comprising:

2 determining an average number of contiguous
3 sequential blocks accessed for each one of said plurality
4 of I/O requests;

5 determining a percentage of previously prestaged
6 data blocks that were actually referenced;

7 determining an adjusted prestage count utilizing
8 said determined average number and said percentage of
9 previously prestaged data blocks that were actually
10 referenced; and

11 utilizing said adjusted prestage count to
12 dynamically adjust said prestaging policy.

1 7. The method according to claim 6, further comprising:

2 determining said adjusted prestage count by
3 multiplying said average number by said percentage of
4 previously prestaged data block that were actually
5 referenced.

1 8. The method according to claim 6, further comprising:

2 determining a current utilization of said storage
3 drive;

4 dynamically adjusting said prestaging policy by
5 determining a new number of data blocks to be prestaged
6 utilizing said current utilization and said adjusted
7 prestage count.

1 9. The method according to claim 8, wherein said
2 determining said new number of data blocks further
3 comprises:

4 determining a percentage of time said storage drive
5 is being utilized;

6 converting said percentage into a fraction; and
7 determining said new number of data blocks by:

8 dividing said fraction by 0.6 to produce a
9 first result;

10 subtracting said first result from 2 to produce
11 a second result; and

12 multiplying said adjusted prestage count by
13 said second result to produce said new number of data
14 blocks.

1 10. A data processing system including a storage device
2 for dynamically determining and adjusting a number of
3 data blocks to be prestaged in a cache included in said
4 storage device, said system comprising:

5 said system including a CPU executing code for
6 receiving and processing a plurality of input/output
7 (I/O) requests by said storage device;

8 said CPU executing code for accumulating information
9 about said plurality of I/O requests and said processing
10 of said plurality of I/O requests by said storage device;
11 and

12 said CPU executing code for utilizing said
13 accumulated information to dynamically adjust a

14 prestaging policy as said storage device receives and
15 processes future I/O requests, said prestaging policy
16 defining a current number of data blocks to be prestaged
17 in said cache.

1 11. The system according to claim 10, wherein said CPU
2 executing code for receiving and processing a plurality
3 of input/output (I/O) requests by said storage device
4 further comprises said CPU executing code for receiving
5 and processing a plurality of contiguous, sequential
6 input/output (I/O) requests by said storage device.

1 12. The system according to claim 10, wherein said CPU
2 executing code for accumulating information further
3 includes:

4 said CPU executing code for determining an average
5 number of contiguous sequential blocks accessed for each
6 one of said plurality of I/O requests.

1 13. The system according to claim 10, wherein said CPU
2 executing code for accumulating information further
3 includes:

4 said CPU executing code for determining a percentage
5 of previously prestaged data blocks that were actually
6 referenced.

1 14. The system according to claim 10, wherein said CPU
2 executing code for accumulating information further
3 includes:

4 said CPU executing code for determining a current
5 utilization of said storage drive.

1 15. The system according to claim 10, further
2 comprising:

3 said CPU executing code for determining an average
4 number of contiguous sequential blocks accessed for each
5 one of said plurality of I/O requests;

6 said CPU executing code for determining a percentage
7 of previously prestaged data blocks that were actually
8 referenced;

9 said CPU executing code for determining an adjusted
10 prestage count utilizing said determined average number
11 and said percentage of previously prestaged data blocks
12 that were actually referenced; and

13 said CPU executing code for utilizing said adjusted
14 prestage count to dynamically adjust said prestaging
15 policy.

1 16. The system according to claim 15, further
2 comprising:

3 said CPU executing code for determining said
4 adjusted prestage count by multiplying said average
5 number by said percentage of previously prestaged data
6 block that were actually referenced.

1 17. The system according to claim 15, further
2 comprising:

3 said CPU executing code for determining a current
4 utilization of said storage drive; and

5 said CPU executing code for dynamically adjusting
6 said prestaging policy by determining a new number of
7 data blocks to be prestaged utilizing said current
8 utilization and said adjusted prestage count.

1 18. The system according to claim 17, wherein said CPU
2 executing code for determining said new number of data
3 blocks further comprises:

4 said CPU executing code for determining a percentage
5 of time said storage drive is being utilized;

6 said CPU executing code for converting said
7 percentage into a fraction; and

8 said CPU executing code for determining said new
9 number of data blocks by:

10 dividing said fraction by 0.6 to produce a
11 first result;

12 subtracting said first result from 2 to produce
13 a second result; and

14 multiplying said adjusted prestage count by
15 said second result to produce said new number of data
16 blocks.

1 19. A computer program product for dynamically
2 determining and adjusting a number of data blocks to be
3 prestaged in a cache included in a storage device, said
4 product comprising:

5 instruction means for receiving and processing a
6 plurality of input/output (I/O) requests by said storage
7 device;

8 instruction means for accumulating information about
9 said plurality of I/O requests and said processing of
10 said plurality of I/O requests by said storage device;
11 and

12 instruction means for utilizing said accumulated
13 information to dynamically adjust a prestaging policy as
14 said storage device receives and processes future I/O
15 requests, said prestaging policy defining a current
16 number of data blocks to be prestaged in said cache.

1 20. The product according to claim 19, further
2 comprising:

3 instruction means for determining an average number
4 of contiguous sequential blocks accessed for each one of
5 said plurality of I/O requests;

6 instruction means for determining a percentage of
7 previously prestaged data blocks that were actually
8 referenced;

9 instruction means for determining an adjusted
10 prestage count utilizing said determined average number
11 and said percentage of previously prestaged data blocks
12 that were actually referenced; and

13 instruction means for utilizing said adjusted
14 prestage count to dynamically adjust said prestaging
15 policy.